

Masahiro KATO\*: **Two species of *Cornopteris* (Athyriaceae)  
in Seram and the reduction of *Neoathyrium*  
Ching et Wang\*\***

加藤雅啓\*: セラム島のシケチンダ属 2 種,  
(付) イッポンワラビ属の検討

*Cornopteris* is distributed in continental Asia from the Himalayas, through China, northeast to Korea and Ussuri (U.S.S.R.), and southeast to the Malay Peninsula. Beyond the continent it has been known from Japan, Taiwan, the Philippines, Sumatra, Java, Bali, Borneo, Sulawesi (Celebes) and apparently disjunctly in Papua New Guinea (Kato 1979, Ohashi et al. 1982). It was not previously reported from Seram (Ceram) Island, the Moluccas, east Indonesia although two species, *C. philippinensis* and *C. seramensis* (sp. nov.) were found to occur and ample specimens were collected in our field trips on the island. Thus, phyto-geographically the genus is primarily characterized as East Asiatic and West Malasian, with the Moluccas and New Guinea the easternmost portion of the distribution range.

In my monographic study of *Cornopteris*, I (Kato 1979) recognized nine species and two putative hybrids (one interspecific, another intergeneric). Later, *C. latiloba* Ching was described from Yunnan and Xizang, southwestern China (Ching & Wu 1983). Although regarded by its authors as close to *C. decur-renti-alata*, *C. latiloba* is in my opinion closest to, or quite probably conspecific with *C. opaca*.

*Neoathyrium* was recently established for *C. crenulatoserrulata* by Ching & Wang (1982) who pointed out supposed morphological and cytological differences from the other species of *Cornopteris*. Those differences are re-examined in this paper with reference to the diagnostic characters of *Cornopteris* including information about the two Seram species.

***Cornopteris philippinensis*** M. Kato, Acta Phytotax. Geobot. 30: 110, Figs.

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6, 10, 1979. Type: Copeland s. n., 1 May 1917, Mt. Matutum, Mindanao (MICH).

Specimens collected and examined. Central Seram, Manusela National Park: along a trail above Piliana (400 m) on the southern slope of Murkele Ridge, Kecamatan (District) Tehoru, 650–1200 m alt., 3°14'S 129°32'E, terrestrial in light shade in slightly mossy, montane oak forest, Iwatsuki et al. C-1024; along a trail between Hatumete (sea level) and Hoale Pass (1770 m) on the southern slope of Murkele Ridge, Kecamatan Tehoru, 550–1200 m alt., 3°14–15'S 129°36'E, terrestrial in montane forest, Kato et al. C-1103, C-7199; along a trail between Kanikeh (620 m) and Wae Ansela (1350 m) on the northern slope of Gunung (Mt.) Binaya (2930 m), Kecamatan Seram Utara, 620–1350 m alt., 3°6–9'S 129°28'E, terrestrial in deep shade in montane forest, Kato et al. C-1397; along a trail between Wae Ansela and Owae Huhu on the northern slope of Gunung Binaya, Kecamatan Seram Utara, 1500–1700 m alt., 3°9'S 129°28–29'E, terrestrial in deep shade in slightly mossy montane forest, Kato et al. C-1476, C-3552.

Distribution. Camiguin, Mindanao, Seram.

Note. This species has been rather poorly known and confused because of its few collections (Copeland 1961, Kato 1979). Copeland (1961, pp. 390–391) remarked that “This (*Athyrium gymnocarpum* Copel.) is known by a single specimen, which may happen to be especially small, and thus not well representative of the species. A specimen from Camiguin, *Bur. Sci.* 14853 Ramos, ...looks distinct, but may represent *A. gymnocarpum* in full development”. I (Kato 1979) identified the type of *A. gymnocarpum* as *C. opaca* (Don) Tagawa and at the same time referred Ramos *Bur. Sci.* 14853 to *C. philippinensis*.

The specimens collected from Seram show great and continuous variation in leaf size from half that of the type of *A. gymnocarpum* to those as large as Ramos *Bur. Sci.* 14853. All the specimens consistently have narrow pinnule segments, less than 3 mm broad in small to medium-sized pinnules, and the largest segments of the largest leaves, to 4 mm broad, are shallowly lobed with lobes as narrow as 1 mm broad. It is notable that even in smaller leaves with lamina 14–26 cm long (Kato et al. C-3552), the largest pinnules on basal pinnae are lobed halfway to costules with segments 2–3 mm broad. By contrast, the type of *A. gymnocarpum* has a larger leaf (30×15 cm) than leaves of Kato et al. C-3552, but with pinnae only obscurely crenate, as usual in smaller leaves of *C. opaca*. By a comparison between the Philippine and Seram specimens, I verify that *C. philippinensis* is distinct from *C. opaca*, to which *A. gymnocarpum*

is reduced.

The characters separating *C. philippinensis* from *C. opaca* and *C. banajaoensis* are also applicable to the Seram specimens. *Cornopteris philippinensis* is "intermediate between *C. opaca* and *C. banajaoensis*, and differs from the former in the long narrowly deltoid-acuminate apex of lamina, narrow lobes of pinnules, less distinct vein-endings, shorter sori and 12-13-celled annuli of sporangia, and from the latter in the thicker roots, more densely scaly stipe-base, less dissected laminae, subentire (shallowly lobed in larger pinnules) margin of lobes and longer sori" (Kato 1979, p. 112).

*Cornopteris philippinensis* was also compared with *C. masachikana*, a putative abortive-spored hybrid between *C. opaca* and *C. banajaoensis*. Each sporangium produces 64 spores, which are bilateral with perispore, ellipsoid and uniform in size. Such a spore character indicates that *C. philippinensis* is an independent species close to *C. opaca*.

*Cornopteris philippinensis* is fairly abundant locally in the Manusela Mountain Ridge. The following is a description of the species in Seram.

Rhizome erect, to 15 cm tall or more; scales at the rhizome apex and stipe base thin, brown, lanceolate, to  $9 \times 2$  mm; stipes brown, pale brown to substramineous, scaly, more sparsely upwards, 13-55 cm long; lamina deltoid or deltoid-ovate, 14-53 cm long, 8-40 cm broad, deeply bipinnatifid to tripinnatifid, the apex long and narrowly deltoid-acuminate, dark brown on the upper surface, paler beneath; basal pinnae opposite or subopposite, upper ones alternate, pinnae 10-15 on either side of rachis, basal acroscopic pinnules smaller than the next above and basal basiscopic pinnules, basal pinnae of the largest leaves oblong-lanceolate,  $25 \times 10.5$  cm, middle ones  $19 \times 7$  cm; pinnules to 15 on either side of costa, largest pinnules on the basiscopic side of basal pinnae  $6.2 \times 1.9$  cm, sessile, truncate at the base, even-sided in the lower 1/3, above gradually narrowed towards the acuminate apex, deeply lobed to 0.5 mm of costules; pinnule segments 12 on either side of costules, almost patent, oblong, slightly surcurrent at the acroscopic base, decurrent at the basiscopic base, separated by sinus about 1 mm wide, to  $10 \times 4$  mm, obliquely lobed 1/3 towards midveins in basal segments with 4 lobes 1 mm broad on each side, or coarsely crenate in upper segments, crenate at the obtuse apex, veins pinnate, lateral veinlets once or twice forked; pinnules on lower pinnae smaller,  $4 \times 1.2$  cm, lobed to less than 1 mm from costules, segments 10 on either side, 3 mm broad, oblong, crenate or subentire, the apex obtuse,

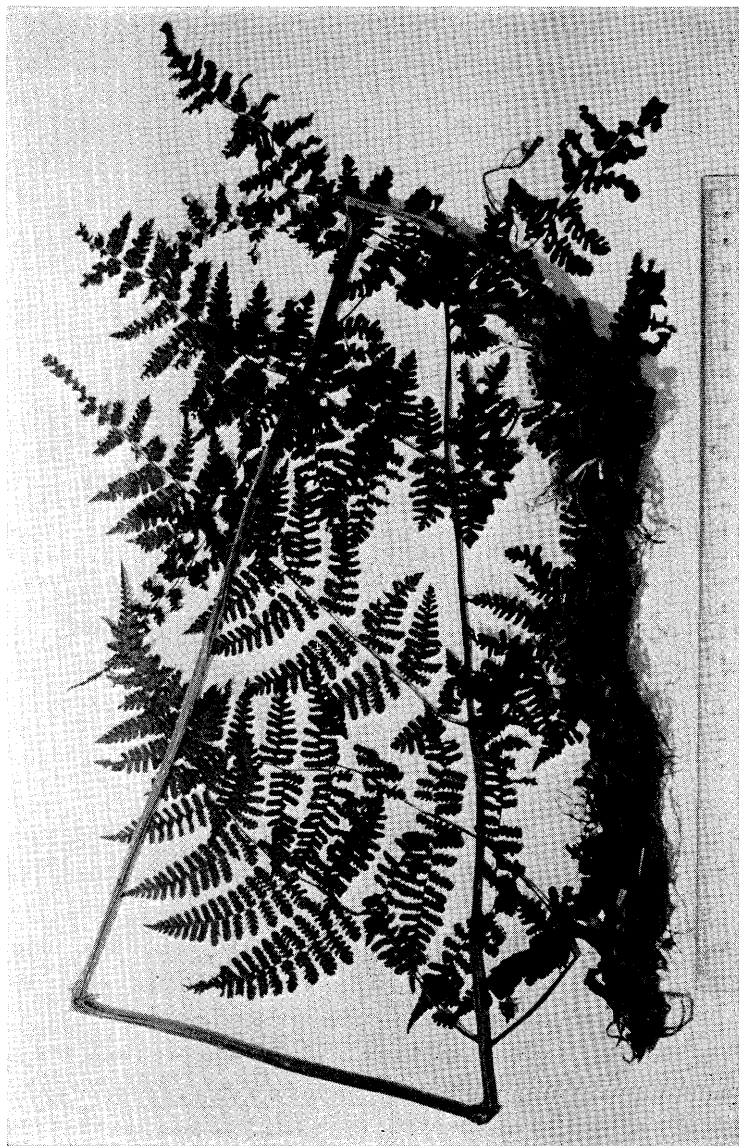


Fig. 1. *Cornopteris seramensis*, Kato et al. C-7702 (holotype).

crenate, veins pinnate with lateral veinlets simple; basal pinnae in the smallest leaves  $5 \times 2$  cm, quite similar to largest pinnules of large leaves except for slightly broader and more deeply lobed pinna segments; costae and costules sparsely scaly with small scales, otherwise glabrous or deciduously hairy, the hairs short, to 4 cells long, several fleshy horn-like projections present in the groove on the upper side of costae at the junction with the rachis, spines (as the endings of ridges along the groove) present on the upper surface at the base of costules; sori exindusiate, near costules or midveins, elliptic, usually to 1 mm long, exceptionally 1.5 mm long, sporangia short-stalked, with annuli of 11-13 cells, spores bilateral, ellipsoid, with reticulate perispore.

**Cornopteris seramensis** M. Kato, sp. nov.

Frondibus tri- vel quadripinnatifidis, segmentis ultimis crenatis, soris rotundis *C. banajaoensis* similis et proxima, sed differt rhizomatibus repentibus.

Type. Central Seram, Manusela National Park: along a trail between Hatumete (sea level) and Hoale Pass (1770 m), southern slope of Murkele Ridge, Kecamatan (District) Tehoru,  $3^{\circ}13-16'S$   $129^{\circ}36-37'E$ , 1200-1770 m alt., terrestrial in light shade in montane forest, Kato et al. C-7702 (TI; isotypes BO, KYO, L, TNS). Fig. 1.

Other specimens collected and examined. Central Seram, Manusela National Park: along a trail between Maraina (810 m) in Manusela Valley and Hatumete (sea side) via Hoale Pass (1770 m), Kecamatan Seram Utara & Tehoru, 1700 m alt.,  $3^{\circ}12-17'S$   $129^{\circ}36-37'E$ , in light shade in montane forest, Kato et al. C-1990; along a trail between Wae (River) Ansela and Wae Huhu, Kecamatan Seram Utara, 1600-1700 m alt.,  $3^{\circ}8-9'S$   $129^{\circ}29'E$ , terrestrial in deep shade in montane forest, Kato et al. C-3508, 3509; along a trail between Owae Puku and Wae Ansela via Wae Huhu, Kecamatan Seram Utara, 1700 m alt.,  $3^{\circ}8-10'S$   $129^{\circ}29'E$ , terrestrial in montane forest in ravine, Kato et al. C-3881.

Rhizome creeping, to 25 cm or more long, bearing stipes radially arranged and slightly spaced, and numerous roots, (rhizomes in very young plants ascending); scales at stipe bases ovate-lanceolate, to  $8 \times 3$  mm, thin, brown; stipes dull brown, 14-62 cm long, scaly at the base, upwards sparsely scaly, deciduously hairy, the hairs minute, unicellular, brown; lamina herbaceous, deltoid, narrow-deltoid or deltoid-ovate, acuminate, 15-57 cm long, 7-30 cm broad, dark brown on the upper surface, paler beneath, subglaucous when fresh, with 10-15 pairs of pinnae; lower pinnae opposite or subopposite, 2-12 cm apart, oblong-lanceolate,

in large leaves to  $22 \times 10$  cm (in small leaves  $4 \times 2$  cm), acuminate, stalked to 1 cm long, with up to 15 pinnules on either side of costae; basal pairs of pinnules in lower pinnae smaller than the next, basiscopic basal pinnules sometimes lacking, large pinnules oblong-lanceolate, to  $7 \times 2.5$  cm, short-stalked, the stalk to 2 mm long, truncate at the base, acute to subacuminate at the apex, almost pinnate with very narrow wings along costules; pinnule segments to 12 on either side of costules, to 7 mm apart, the basal segments usually smaller than the next above, oblong, to  $15 \times 6$  mm, adnate to costular wing by narrowed, subtruncate or broadly cuneate base, subtruncate-obtuse at the crenate apex, deeply lobed to less than 1 mm from costule; ultimate segments 6 on either side, separated by sinus less than 0.5 mm wide, oblong, slightly falcate, entire, the apex obtuse, weakly crenate; medium-sized pinnules 1.5 cm apart, sessile, truncate, acute or obtuse-pointed, oblong,  $3.5 \times 1.2$  cm, deeply lobed to costular wing 0.5 mm broad, pinnule segments to 9 on either side of costules, oblong,  $5 \times 2.5$  mm, lobed half-way to costules or more shallowly, the apex subtruncate, crenate, ultimate lobes oblique, 1 mm broad; pinnae of small leaves resembling pinnules in large leaves, short-stalked, the stalk 1 mm long, truncate, gradually narrowed towards the acute crenate apex, oblong,  $4 \times 1.5$  cm, deeply lobed to a very narrow costal wing, pinnules 9-10 on either side of costae, 4 mm apart, adnate by the narrowed, broadly cuneate base or decurrent, the apex obtuse or subtruncate, and crenate, oblong,  $6 \times 3$  mm, lobed half-way to costule, basal pinnules more deeply lobed, more distal pinnules more shallowly lobed, ultimate segments oblique, 4 on either side, less than 1 mm broad; veins free, pinnate with simple or forked lateral veinlets in segments, once or twice forked in ultimate lobes; costae and costules sparsely scaly, the scales small, deciduously hairy, the hairs short, unicellular, corniculate with several fleshy horn-like projections in the groove on the upper side at the junction, short spines at the end of ridge along groove on the upper surface of pinnules or pinnule segments; sori exindusiate, near costules or midveins, round; chromosome number  $n=40$ .

Distribution. Seram.

Note. This species is quite similar to *C. banajaoensis* in morphological characters including trichomes, segmentation of pinnae and pinnules, and sori, but differs notably in its more or less long-creeping rhizomes. A similar difference in rhizome habit is seen between *C. decurrenti-alata* (creeping) and *C. opaca* (erect). The chromosome number of *C. seramensis* was examined to be

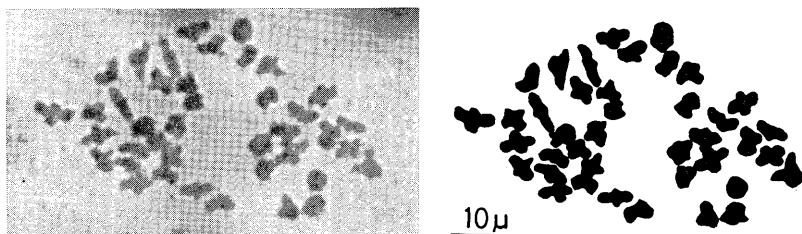


Fig. 2. Gametic chromosomes ( $n=40$ ) of *Cornopteris seramensis*.

$n=40$  at meiotic metaphase in spore mother cells (Fig. 2), using living material cultivated in Botanical Gardens, University of Tokyo (voucher specimens C-7702 bis, C-7702, TI). The number is the same as that of *C. banajaoensis*. Therefore, *C. seramensis* is considered to be a local derivative of the common ancestor from which the more widely distributed *C. banajaoensis* has been derived.

Nakaike 41 (TNS) from Morobe District in Papua New Guinea was identified by me as *C. banajaoensis* (Kato 1979). Although fertile, the specimen may represent a rather young developmental stage: rhizome thin, apparently ascending or erect, stipes to 15 cm long, lamina lanceolate, to  $21 \times 6$  cm, the basal pinnae reduced, nearly half the size of the next above. The specimen differs from *C. banajaoensis* and *C. seramensis* in its lamina outline, but some specimens, especially of younger plants, occasionally have a similar outline in *C. seramensis*; Kato et al. C-3508 consists of younger semi-fertile plants with some leaves bearing more or less reduced basal pinnae, approaching Nakaike 41. The New Guinean *Cornopteris*, pending further collections, is of uncertain identity.

#### Comments on *Neoathyrium*

*Neoathyrium* was established for *C. crenuloserrulata* (Makino) Nakai by Ching & Wang (1982). The genus was based on such characters as: "the well-spaced fronds are biserially arranged along a thick and long-creeping rhizome, the base of stipe is thickened and not attenuated towards the point of attachment, the deltoid-ovate lamina with the basal pinnae as long as those next above, which all are distinctly petiolate and the rachis, costae and especially the costules of pinnules clad in fine pale-colored generally septate hairs underneath". However, it is impossible to characterize *Neoathyrium* by rhizome habit, because the rhizomes (all are radially symmetrical) are creeping in *C.*

*christensenia*, *D. decurrenti-alata* and *S. seramensis*. The other morphological characters are not significant enough to warrant recognition of the genus *Neoathyrium*. Chromosome number  $n=40$  was cited as another character to separate *Neoathyrium* from *Cornopteris*, which Ching & Wang described as having  $x=41$ . Actually the same basic chromosome number  $x=40$  as well as  $x=41$  is known in *Cornopteris*:  $n=120$  in *C. christensenia*,  $n=80$  in *C. decurrenti-alata*, and  $n=40$  in *C. banajaoensis* and *C. seramensis*.

The key characters of the genus *Cornopteris* are as follows: lower pinnae opposite or subopposite, basal acroscopic pinnules as long as or shorter than the next above, costae and costules corniculate with several fleshy horn-like projections in the groove on the upper side at the junction, and exindusiate sori. All these are shared by *C. crenuloserrulata*, although Ching & Wang (1982) described it as lacking the projections and spines. Furthermore, *C. christensenia* is considered to be of hybrid origin between *C. crenuloserrulata* and *C. decurrenti-alata*. Thus, *C. crenuloserrulata* is too close to the other species of *Cornopteris*, especially *C. christensenia* and *C. decurrenti-alata* to separate it out into a new genus, and it is here reduced to synonymy.

***Cornopteris*** Nakai; M. Kato, Acta Phytotax. Geobot. 30: 102, 1979.—*Neoathyrium* Ching & Z.R. Wang, Acta Phytotax. Sin. 20: 76, 1982, syn. nov.

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東インドネシアのモルッカ諸島にはシケチンダ属（メンダ科）が分布することは知られていなかったが、セラム島植物調査において2種を採集したので報告する。*Cornopteris philippinensis* はこれまでミンダナオからのみ記録され、標本も少なく十分理解されていなかった種である。大きさは変異が著しいが、根茎、葉とくに先端の形、小羽片の切れ込みなどからみて、ナンゴクシケチンダ *C. opaca* に近い種である。本種は正常な孢子をもち、ナンゴクシケチンダとホソバシケチンダ *C. banajaoensis* の種間雑種と推定されるヤクシケチンダ *C. masachikana* とは明らかに異なる類縁を示す独立種である。新種 *C. seramensis* はホソバシケチンダに非常によく似ているが、根茎が25 cm かそれ以上も長く匍匐する点で異なる。本種はホソバシケチンダからの派生種である。最近、秦・王（1982）はイッポンワラビ属 *Neoathyrium* をたてた。彼らがとりあげた指標形質（根茎、葉柄基部、葉形、毛、染色体数など）はシケチンダ属と共通するか、せいぜい種差を示すものであることが、セラム島の2種、とくに *C. seramensis* を考慮に入れるとますますはっきりしてくる。イッポンワラビ *C. crenuloserrulata* はシケチンダ *C. decurrenti-alata* やハコネシケチンダ *C. christenseniana* の近縁種である。

□江東区(編)：続江東区の野草 207pp. 1986. 江東区，東京，¥1,000. 1984年に出版されたものの続編で，カラー写真を分類順に配置し，浅井康宏，飯泉 優，加藤億重，山田隆彦の四氏が解説しているほか，ところどころに有用植物，帰化植物などについての解説がある。巻末に江東区の野草リストがあり，これによると653種類のうち前書で114種類，本書で175種類が収録されたことになる。アレチヒナユリなる新和名が公表されている。頁下端の色分けは植物群と解説頁の区分を示すものらしいが，説明がないのでなにか新機軸なのかもしれない。（金井弘夫）

□Kuwahara, Y.: *The Metzgeriaceae of the neotropics* 254 pp. 1986. J. Cramer, Stuttgart. 著者の桑原幸信博士は永年フタマタゴケ科の分類学的研究を進められていたが，今回上記のように新熱帯の種類をモノグラフ的に取りまとめられた。本書は第1部 “The genus *Metzgeria* in the tropical Andes” 及び第2部 “A survey of the family Metzgeriaceae in the west Indies, Mexico, and Central America” の2部からなる。各々の地域の種類が記載と図を伴って取扱われている。必ずしも2部構成にしなくても，全体を取りまとめて一つのモノグラフとした方が利用する立場からは便利であろう。（井上 浩）